Aluminum vs Composite

Question

My question:
Which bat is better for hitting a baseball an aluminum or composite bat?

The problem I'm trying to solve with this experiment is:
I am trying to figure out which bat is better for hitting a baseball. An aluminum or composite bat.

Purpose

In this experiment, I will:
Figure out which bat is better for hitting a baseball.

I want to do this experiment because:
I play baseball and I want an advantage when I'm up to bat.

The information gained from this experiment will help other people by:
Giving them the information about which hits a ball further and which type of bat they should buy.

Research

Aluminum bats are made by a blank piece of aluminum rod molded into a bat shape and then fitted with an end cap and stopper. They are light and strong so they last longer (Discovery).

Composite bats are made with multiple layers of carbon fibers that are shaped to make the bat light, strong and gives it pop. They are sometimes called plastic bats (Bat Digest).

Pros of an aluminum bat are it is cheaper, stronger and doesn't have a break in period like composite bats. Cons of an aluminum bat are it has a smaller sweet spot, less speed and power and sends strong vibrations through your hands. Pros of a composite bat are it has less vibration, bigger sweet spot and more pop. Cons of a composite bat are it is more expensive, needs to be broken in and they don't last as long because it is less durable and sensitive to temperature (Smash It Sports).

Aluminum bats can be used for multiple seasons if properly taken care of. They perform well, are durable, light and allows for faster swinging (Academy Sports + Outdoors).

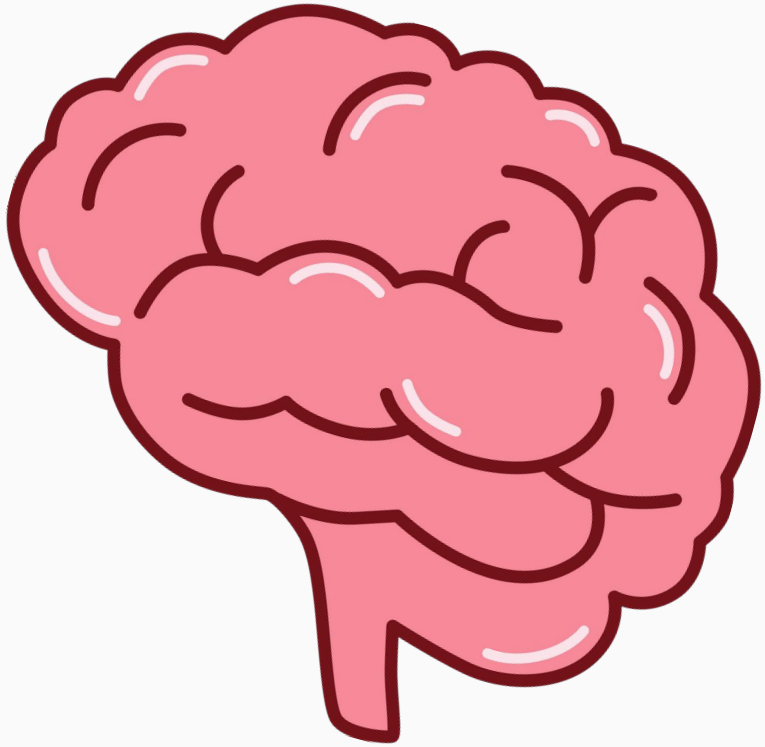
Composite bats are popular in youth baseball because they improve the players performance with faster bat speeds, more power and have a bigger sweet spot so the player makes more contact with the baseball (Axe).

Deciding between an aluminum bat and a composite bat is mainly your decision. It comes down to what you like. People like aluminum bats because they can be used right away, are consistent and will hold up better with lots of use. People like composite bats because they have a bigger sweet spot, have more pop and don't vibrate as much as aluminum bats (Smash It Sports).

Hypothesis

If I test which bat performs the best, aluminum or composite, to determine which bat hits the ball the furthest, then I expect the composite bat to hit further than the aluminum bat.

I base my hypothesis on: Smash it Sports that explains the pros and cons of aluminum and composite bats.



Variables

My variables are:

Dependent: Distance
Independent: Which bat I use to see the difference.

Procedure

1: Hit a baseball 25 times with a aluminum bat
Measure the distances
Hit a baseball 25 times with a composite bat
Measure the distances

2: Hit a baseball 25 times with a aluminum bat
Measure the distances
Hit a baseball 25 times with a composite bat
Measure the distances

3: Hit a baseball 25 times with a aluminum bat
Measure the distances
Hit a baseball 25 times with a composite bat
Measure the distances

4: Hit a baseball 25 times with a aluminum bat
Measure the distances
Hit a baseball 25 times with a composite bat
Measure the distances

5: Hit a baseball 25 times with a aluminum bat
Measure the distances
Hit a baseball 25 times with a composite bat
Measure the distances

Materials

50 baseballs - $99.96

Aluminum baseball bat - $299.49

Composite baseball bat - $349.99

Measuring wheel - $19.97

Pencil - $0.25

Clipboard - $14.57

Piece of paper - $1.50

Conducting the experiment/Data

	Trial 1
Aluminum	Composite
93	217
189	180
180	91
92	84
161	140
65	137
113	52
187	131
104	117
141	166
39	113
127	183
166	120
139	201
161	162
136	206
95	19
134	129
119	135
84	177
41	63
144	112
59	138
203	72
142	83

	Trial 2
Aluminum	Composite
156	161
60	71
110	134
187	116
101	209
142	173
140	152
118	133
163	111
130	165
92	127
133	19
194	74
136	169
115	151
184	12
46	123
144	219
51	156
198	137
145	117
186	184
172	8
131	197
128	68

	Trial 3
Aluminum	Composite
174	204
192	77
183	13
95	117
159	189
163	144
112	152
190	201
107	137
146	12
119	155
128	181
170	79
134	11
99	123
136	164
97	119
137	133
146	157
201	173
96	209
151	116
148	143
86	76
120	156

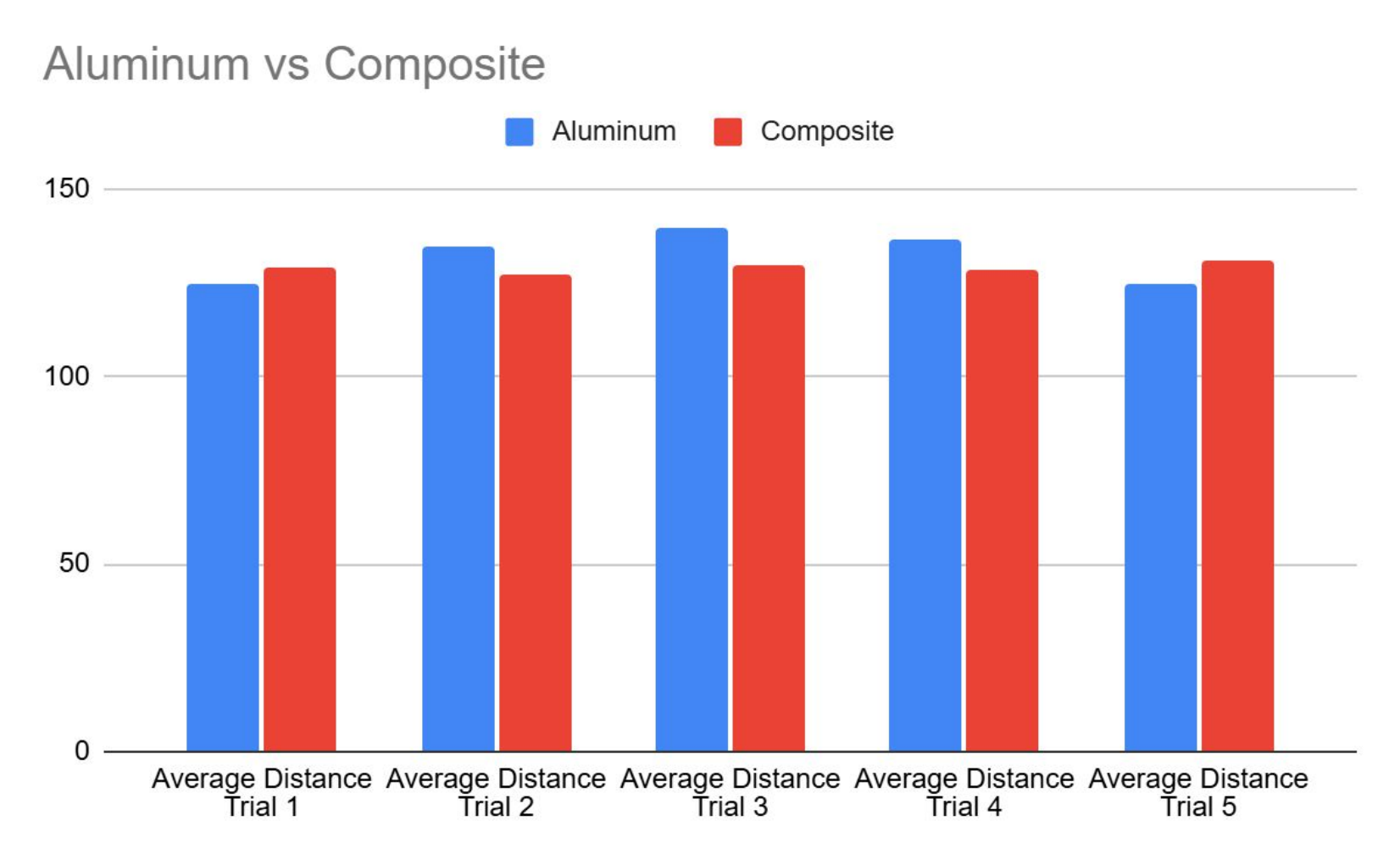
Conducting the experiment/Data

	Trial 4
Aluminum	Composite
187	72
154	198
171	10
148	187
199	120
59	146
155	153
49	211
83	133
157	8
140	156
98	171
136	71
166	15
131	128
159	167
147	112
102	137
191	154
60	171
90	205
189	113
197	137
61	160
189	72

	Trial 5
Aluminum	Composite
91	220
10	184
131	84
165	143
171	83
161	133
95	49
201	120
153	133
133	174
76	121
23	172
172	125
91	202
154	169
193	22
2	127
154	201
216	179
130	147
57	79
101	144
97	76
176	114
171	69

Results

	Average Distance Trial 1	Average Distance Trial 2	Average Distance Trial 3	Average Distance Trial 4	Average Distance Trial 5
Aluminum	124.56	134.48	139.56	136.72	124.96
Composite	129.12	127.44	129.64	128.28	130.8



Conclusion

My hypothesis was proved: Wrong

I predicted: The composite bat would hit further, but the aluminum bat actually hit further.

This happened because: the aluminum bat is more durable, consistent, reliable and performed better.

The factors that may have caused this outcome are: The aluminum bat isn't easily damaged, isn't sensitive to temperature, it performs well over long periods of time and doesn't require a break in period.

I could further test this project by: I could redo the experiment more times with different brands of bats and see which type hits further.

Real world uses for this information include: Which bat you should use for hitting a baseball.

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